The sum of the squares of the absolute terms of the equations is $+4\cdot3105$, and the sum of the squares of the residuals is $+4\cdot1077$; from whence the probable error in arc of one complete observation of the position angle is

$$\pm 0''\cdot263.$$

If we combine the two values of the parallax, making due allowance for the weights, we obtain as the final result of this series of observations

$$\pi = -0''\cdot045 \pm 0\cdot070.$$

If this result were to be strictly interpreted, it would mean that the comparison star was actually the less distant of the two. Observing, however, that the probable error is greater than the parallax itself, it would seem unsafe to draw any conclusion from these observations, except that the difference between the parallaxes of P III 242 and $+37°$ 877 is too small to be measured with accuracy.

A Determination of the Diameter of Mars at the Mean Distance of the Earth from the Sun. By A. M. W. Downing.

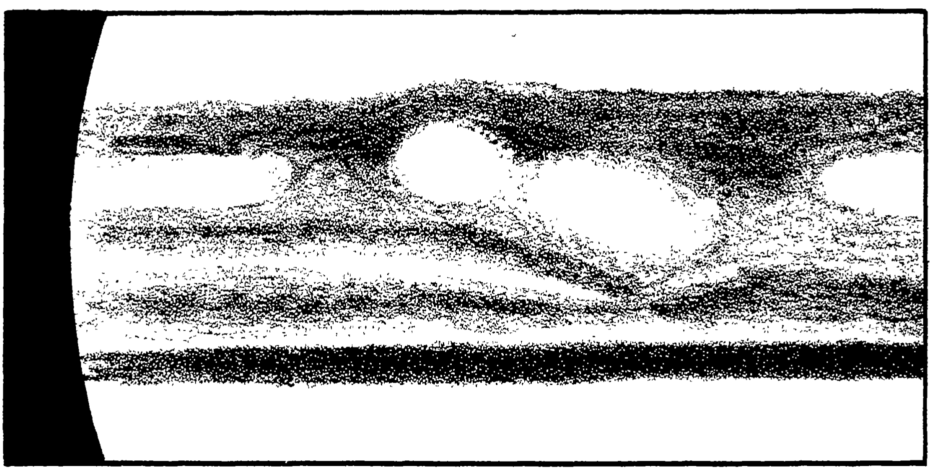
Recent investigations have shown conclusively that Le Verrier's value of the diameter of *Mars*, which has been adopted in the English *Nautical Almanac* since 1866, is considerably too large.

Thus the diameter according to

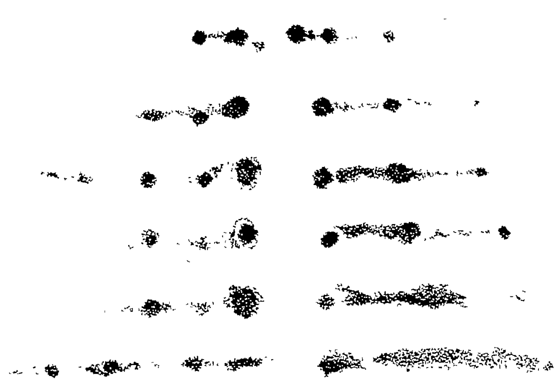
Le Verrier is	11''·10	(*Annales de l'Observatoire*, tome vi.)
Hartwig ,,	9·352	(*Publ. Ast. Ges.*, No. xv.)
Young ,,	10·068	(*Am. Journal*, March 1880)
Pritchett ,,	9·486	(*A. N.* No. 2309).

Under these circumstances it is desirable that the value of the diameter of *Mars*, found from the observations made with the Greenwich Transit-Circle, should be computed, and in the present paper I give the results obtained from the investigation. This determination cannot of course compare in accuracy with values derived from heliometer or other double-image measures, but is rather intended to supply the proper value of the diameter to be used when from accident of weather, or defect of illumination, only one limb of the planet can be observed at Greenwich. It must, however, be remembered that we have more than 500 measures of the diameter made with the same instrument, since its erection in 1851.

The Great Red Spot.



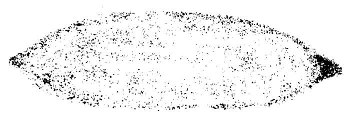
Oct, 18th. 11h 20m. Portion of Gt Equatorial belt on W. limb. showing two white spots.



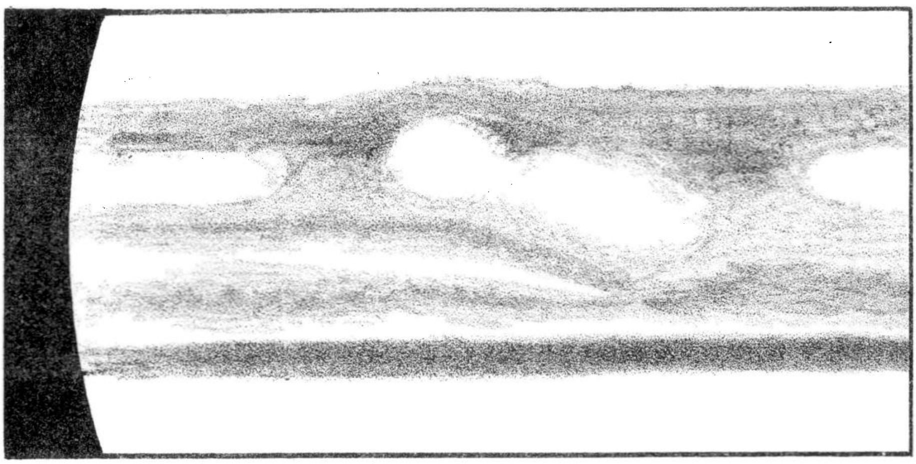
h. m.
Oct. 24, 11. 0.
Oct. 29, 7 31.
Nov. 2, 9. 31.
Nov. 3, 5. 5.
Nov. 4, 10.41.
Nov. 8, 12.37.

Group of Dark Spots in N. Hemisphere.

Spottiswoode & Co Lith London.



The Great Red Spot.



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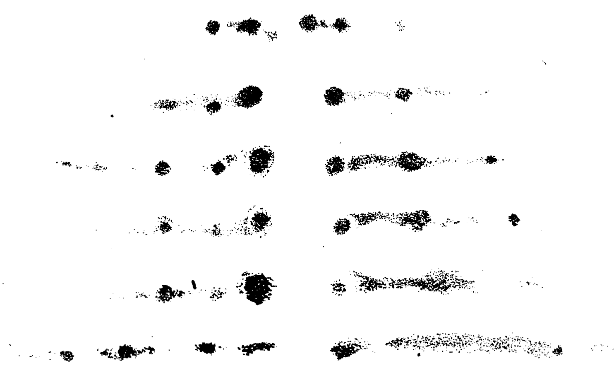

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Group of Dark Spots in N. Hemisphere.

Spottiswoode & Co. Lith. London.

From 1851 to 1865, the value of the diameter of *Mars* assumed in the *Nautical Almanac*, and with which the Greenwich observations have been compared, was $8''\cdot87$. Let the true diameter$=8''\cdot87\ (1+y)$, and let x be the constant correction to the assumed value for irradiation, then each observation of vertical diameter of the planet gives an equation of the form

$$x + 8''\cdot87(1+y) = \text{observed diameter.}$$

There are 272 observations of vertical diameter in the years 1851–1865, and the equations of condition being solved by the method of least squares, we have

$$\begin{aligned} 272\ \ x + 3881\cdot2\ \ y &= \ 983''\cdot13 \\ 3881\cdot2\ x + 59708\cdot42\ y &= 14396\cdot94 \end{aligned}$$

whence

$$\begin{aligned} x &= +2''\cdot399 \ \pm 0''\cdot261 \\ y &= +0\cdot0852 \pm 0\cdot018, \end{aligned}$$

it being assumed that each observation is a measure of the same physical quantity, *i.e.* neglecting the ellipticity of the disk.

The probable error of a single measure of diameter, found from Lüroth's extension of Peters' formula, viz.,

$$\epsilon = 0\cdot8453 \frac{\Sigma e}{\sqrt{n(n-\mu)}},$$

where Σe is the sum of the residuals without regard to sign, n the number of equations, μ that of the unknown quantities, is

$$\pm 1''\cdot158.$$

From this series of observations therefore we have

$$\text{True diameter} = 8''\cdot87(1+y) = 9''\cdot625 \pm 0''\cdot156. \qquad (1)$$

Since 1866 the value of the diameter adopted is $11''\cdot10$, therefore we have

$$x' + 11''\cdot10(1+y') = \text{observed diameter,}$$

and solving by the method of least squares, the 265 equations derived from the observations of vertical diameter made since 1866, there results:—

$$\begin{aligned} 265\ \ x' + 4488\cdot1\ \ y' &= \ 78''\cdot88, \\ 4488\cdot1\ x' + 83671\cdot97\ y' &= 412\cdot37, \end{aligned}$$